UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

In re: Methyl Tertiary Butyl Ether ("MTBE") Products Liability Litigation

This document pertains to:

***City of New York v. Amerada Hess Corp. et al.*, Case No. NY-04-CV-03417**

Master File No. 1:00-1898
MDL 1358 (SAS)
M21-88

DECLARATION OF JENNIFER KALNINS TEMPLE IN SUPPORT OF DEFENDANTS' OPPOSITION TO PLAINTIFF'S MOTION *IN LIMINE* NO. 8 TO EXCLUDE EVIDENCE OR ARGUMENT CONCERNING TREATMENT COSTS ASSOCIATED WITH OTHER VOCs

JENNIFER KALNINS TEMPLE, an attorney duly licensed to practice law in the State of New York and in the United States District Court for the Southern District of New York, hereby declares the following under penalties of perjury:

1. I am a member of the law firm McDermott Will & Emery LLP, counsel for defendant Exxon Mobil Corporation in the above-captioned case. I respectfully submit this Declaration in further support of *Defendants' Opposition to Plaintiff's Motion in Limine No. 8 to Exclude Evidence or Argument Concerning Treatment Costs Associated With Other VOCs* (hereinafter "Defendants' Opposition") that is being filed concurrently herewith in the above-captioned case. This Declaration authenticates the exhibit attached and referenced in Defendants' Opposition. In accordance with this Court's Individual Rules and Procedures, only the relevant pages of each exhibit are attached.

2. Attached at Exhibit A are true and correct copies of relevant pages from Plaintiff's Undisputed Facts in its Proposed Pre-Trial Order. The attached copies were made on or about May 26, 2009.

3. Attached at Exhibit B are true and correct copies of relevant pages from the Expert Report of Donald K. Cohen and Marnie A. Bell (Feb. 7, 2009). The attached copies were made on or about May 26, 2009.

4. Attached at Exhibit C are true and correct copies of relevant pages from the Jamaica Water Supply Company 1987 Master Water Supply Plan Update Report. The attached copies were made on or about May 26, 2009.

5. Attached at Exhibit D are true and correct copies of relevant pages from the deposition of Marnie A. Bell (Apr. 20, 2009). The attached copies were made on or about May 26, 2009.

6. Attached at Exhibit E are true and correct copies of relevant pages from the Revised Expert Report of David W. Hand, Ph.D. (Apr. 1, 2009). The attached copies were made on or about May 26, 2009.

7. Attached at Exhibit F are true and correct copies of relevant pages from the deposition of David W. Hand, Ph.D. (Apr. 23, 2009). The attached copies were made on or about May 26, 2009.

Dated: May 26, 2009

JENNIFER KALNINS TEMPLE

EXHIBIT A

Riccardulli, Stephen

From: Joshua Stein [jstein@sherleff.com]
Sent: Saturday, May 09, 2009 3:57 AM
To: Riccardulli, Stephen; Susan Amron; Vic Sher
Cc: Pardo, James; Sacripanti, Peter; Kalnins Temple, Jennifer; moller@blankrome.com; ben.krowicki@bingham.com; coy.connelly@bracewellgiuliani.com
Subject: RE: MDL 1358: City of New York - Defendants' Draft Proposed Joint Pretrial Order

Attachments: Plaintiffs Draft Pretrial Order.pdf

Plaintiffs Draft Pretrial Orde...

Mr. Riccardulli -

Please find attached the City's draft proposed Pretrial Order. The City looks forward to discussing areas of potential agreement. In particular, as to potential stipulated facts, the City has included a set of proposed stipulated facts illustrative of its approach to this matter, as well as additional topical areas where we could reach similar agreement.

Sincerely,

Joshua Stein
Sher Leff LLP
450 Mission St. #400
San Francisco, CA 94105

-----Original Message-----
From: Riccardulli, Stephen [mailto:sriccardulli@mwe.com]
Sent: Fri 5/8/2009 7:26 PM
To: Susan Amron; Vic Sher; Joshua Stein
Cc: Pardo, James; Sacripanti, Peter; Kalnins Temple, Jennifer; moller@blankrome.com; ben.krowicki@bingham.com; coy.connelly@bracewellgiuliani.com
Subject: MDL 1358: City of New York - Defendants' Draft Proposed Joint Pretrial Order

Susan,

Per our conversation from earlier this week, attached is Defendants' Draft Proposed Joint Pretrial Order. As we discussed, we are not exchanging any of the related materials (e.g., verdict forms) at this time. We should talk early next week to select dates for the meet-and-confer to finalize the Pretrial Order.

Regards,

Stephen J. Riccardulli

McDermott Will & Emery LLP

340 Madison Avenue

New York, New York 10173-1922

tel (212) 547 - 5579

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67

Scheindlin, District Judge:

Having conferred among themselves and with the Court pursuant to Rule 16, Fed. R. Civ. P., the parties adopt the following statements, directions, and agreements as the Pretrial Order:

1. TRIAL COUNSEL:

Plaintiff's Counsel:

Susan E. Amron
Environmental Law Division
New York City Law Department
100 Church Street
New York, NY 10007

Victor M. Sher
Joshua Stein
Sher Leff LLP
450 Mission St. #400
San Francisco, CA 94105

Robert S. Chapman
Greenberg Glusker LLP
1900 Avenue of the Stars, 21st Floor
Los Angeles, CA 90067

2. NATURE OF ACTION AND JURISDICTION / VENUE:

The Court has jurisdiction over this matter pursuant to 28 U.S.C. § 1332(a) and venue is proper pursuant to 28 U.S.C. § 1391(a)(2). The City of New York brings this action to recover damages for the contamination with MTBE of the NYC Groundwater system, specifically the wells in the relevant geographic area of Queens. Defendants are liable for the costs of cleaning up their pollution, punitive damages for their malice in creating the pollution problem in the groundwater, civil penalties, attorneys fees and costs, and injunctive relief under the 9 claims advanced by the City of New York:

(1) Strict Liability for Design Defect
(2) Strict Liability for Failure to Warn
(3) Negligence
(4) Conspiracy
(5) Public Nuisance
(6) Private Nuisance
(7) Trespass
(8) New York's Navigation Law
(9) Toxic Substances Control Act.

water quality, managerial, and cost aspects of using the aquifer as a mid-term supply to supplement the existing surface water system.

23. In 1994, the City, partnered with the United States Geological Survey (USGS), commenced a comprehensive multi-year planning study of the NYC Groundwater System entitled the Brooklyn-Queens Aquifer Study.

24. In 1999, the findings of the Brooklyn-Queens Aquifer Study were published in a report entitled "The Feasibility Study for Use of the Brooklyn-Queens Aquifer as an Additional Potable Water Supply Source" ("BQA Study").

25. Among other things, the BQA Study recommended that groundwater should be used for potable drinking water supply, and that the groundwater should be treated at several regional treatment facilities, or well clusters.

26. The BQA Study recommended that the first well treatment cluster would be sited at Station 6, and that it would be used to demonstrate to the public that high quality drinking water on par with the quality of the City's upstate water, could be served from the NYC Groundwater System.

27. Another water management plan involving the use of the NYC Groundwater System is the New York City Drought Management Plan.

28. This plan states that at each level of the three drought stages – Drought Watch, Drought Warning, and Drought Emergency (which is divided into four sub-phases) – the normal output from the NYC Groundwater System should be increased to supplement upstate drinking water supply.

29. The Drought Management Plan has been approved by the State of New York and the Multi-State Delaware River Basin Commission.

30. Pursuant to the Drought Management Plan, the NYC Groundwater System should produce 44 mgd during a Drought Watch, 50 mgd under a Drought Warning, and 62 mgd during Phases I though III of a Drought Emergency.

31. The City has made capital investments in the NYC Groundwater System to increase its capacity under drought conditions.

32. In response to the 2002 City-wide Drought Emergency, DEP upgraded 10 well stations (21, 22, 26, 38, 51, 52, and 55) to increase the capacity of the NYC Groundwater System.

33. As part of the capacity-building project subsequent to the 2002 Drought Emergency, GAC treatment systems were installed at Stations 21, 22, 26, 38, 51, 52, and 55 to remove volatile organic compound ("VOC") contamination.

34. The GAC treatment system at Well 38 was installed subsequent to the 2002 Drought Emergency solely due to the presence of MTBE contamination.

213. The City and Malcolm Pirnie, Inc. convened a Citizens Advisory Committee ("CAC") to discuss the Station 6 project and other groundwater projects with the local community.

214. The CAC met regularly from 2002 to May 2005.

215. The CAC selected a Scientific Review Panel of scientific experts to provide technical advice to the CAC on the Station 6 project.

216. As of 2005, the CAC supported the Station 6 project.

217. The City currently plans to contract for completion of design work on the Station 6 project to occur during Fiscal Year 2012 (which begins in July 2011).

218. The City currently plans to contract for construction of the Station 6 treatment facility starting in Fiscal Year 2015 (which begins in July 2014) and lasting up to four years.

219. The City currently plans to begin operating the Station 6 treatment facility in 2018.

220. The City's plans to construct and operate Station 6 have been delayed for budgetary reasons.

221. Funding for design, construction, and construction management work on the Station 6 treatment facility is included in the current City capital budgets for Fiscal Years 2012, 2013, 2014, 2015, and 2016.

222. The West Side Corporation formerly operated a storage and distribution facility for dry cleaning chemicals at 107-10 180th Street in Queens ("West Side Corporation site").

223. The City is currently working with New York State to design and build a remediation system to remove tetrachloroethylene ("perc") contamination associated with the West Side Corporation site from groundwater.

224. The remediation system for the West Side Corporation site will include two recovery wells, located adjacent to the West Side Corporation site on the site of a former NYC Groundwater System facility known as Station 24, that will remove contaminated groundwater from the aquifer.

225. When operational, the Station 24 remediation system will pump groundwater out of the aquifer at a rate of 700 to 1,100 gallons per minute.

226. Water removed from the aquifer by the Station 24 remediation system will be treated and discharged to the storm sewer system, and will not be pumped to the distribution system.

227. The Station 24 remediation system will begin operating in 2010 and will have been operating for several years when Station 6 begins operating.

228. The Station 24 remediation system will prevent groundwater perc contamination from the former Westside Corporation facility from being pulled into Station 6.

229. The Station 24 remediation system will also prevent any MTBE from DEP's Station 24/Queens Repair facility from being pulled into Station 6.

230. The City has already expended $868,000 for technical services related to the MTBE contamination in the Station 6 Wells.

231. Construction of air stripping and vapor-phase GAC equipment at Station 6 sufficient to achieve a finished water treatment goal of <1 microgram MTBE per liter of water will cost an estimated $69,780,000 in 2009 dollars.

232. Installation of liquid-phase GAC equipment at Station 6 sufficient to achieve a finished water treatment goal of <1 microgram per liter of MTBE will cost an estimated $60,650,000 in 2009 dollars.

233. Projected operation and maintenance costs of air stripping and vapor-phase GAC treatment at Station 6 range from $123,490,000 to $168,700,000, depending on pumpage rates and treatment goals.

234. Projected operation and maintenance costs of liquid-phase GAC treatment at Station 6 range from $234,680,000 to $277,790,000 depending on pumpage rates and treatment goals.

235. MTBE was first detected in raw water drawn from Well 6 on August 8, 2002 at a concentration of 1 microgram per liter.

236. The highest concentration of MTBE detected in raw water drawn from Well 6 to date was 2.3 micrograms per liter, which was detected on September 5, 2002.

237. MTBE was most recently detected in raw water drawn from Well 6 on November 9, 2006 at a concentration of 0.78 micrograms per liter.

238. During the period that the City has been sampling its wells for MTBE, MTBE has been detected in 8 of 10 samples drawn from Well 6.

239. MTBE was first detected in raw water drawn from Well 6A on March 4, 2002 at a concentration of 8.9 micrograms per liter.

240. The highest concentration of MTBE detected in raw water drawn from Well 6A so far was the 8.9 micrograms per liter detected on March 4, 2002.

241. MTBE was most recently detected in raw water drawn from Well 6A on June 29, 2004 at a concentration of 1.3 micrograms per liter.

242. During the period that the City has been sampling its wells for MTBE, MTBE has been detected in 5 of 7 samples drawn from Well 6A.

243. MTBE was first detected in raw water drawn from Well 6B on March 26, 2002 at a concentration of 2 micrograms per liter.

244. The highest concentration of MTBE detected in raw water drawn from Well 6B so far was 6.5 micrograms per liter, detected on August 12, 2002.

245. MTBE was most recently detected in raw water drawn from Well 6B on April 10, 2007 at a concentration of 2.3 micrograms per liter.

246. During the period that the City has been sampling its wells for MTBE, MTBE has been detected in 40 of 40 samples drawn from Well 6B.

247. MTBE was first detected in raw water drawn from Well 6D on April 18, 2000 at a concentration of 1.5 micrograms per liter.

248. The highest concentration of MTBE detected in raw water drawn from Well 6D so far was 350 micrograms per liter, detected on January 28, 2003.

249. MTBE was most recently detected in raw water drawn from Well 6D on February 28, 2007 at a concentration of 77 micrograms per liter.

250. During the period that the City has been sampling its wells for MTBE, MTBE has been detected in 18 of 18 samples drawn from Well 6D.

251. MTBE was first detected in raw water drawn from Well 33 on April 18, 2000 at a concentration of 0.73 micrograms per liter.

252. The highest concentration of MTBE detected in raw water drawn from Well 33 so far was 2.1 micrograms per liter, detected on April 21, 2000.

253. MTBE was most recently detected in raw water drawn from Well 33 on June 28, 2004 at a concentration of 0.63 micrograms per liter.

254. During the period that the City has been sampling its wells for MTBE, MTBE has been detected in 5 of 47 samples drawn from Well 33.

255. As a result of releases of MTBE gasoline from gasoline stations within or in the vicinity of the capture zones for the Station 6 Wells, MTBE is projected to be present in raw water drawn from each of the Station 6 Wells at levels above 1 ppb from the beginning of Station 6 operations through at least 2040.

256. As a result of releases of MTBE gasoline from gasoline stations within or in the vicinity of its capture zone, MTBE is projected to be present in raw water drawn from Well 33 at levels above 10 ppb from the beginning of Station 6 operations through at least 2040.

EXHIBIT B

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UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

In Re: Methyl Tertiary Butyl Ether ("MtBE")

Products Liability Litigation

MDL No. 1358

Master File C.A. No.

1:00-1898 (SAS)

This document relates to the following cases:

City of New York v. Amerada Hess Corp., et al.

04 Civ. 3417

EXPERT REPORT OF

Donald K. Cohen, CPG

Marnie A. Bell, P.E.

Malcolm Pirnie, Inc.

2701 Queens Plaza North, Suite 800

Long Island City, NY 11101

Donald K Cohen — February 7, 2009

M Bell — February 7, 2009

Signature — **Date**

2.3.2. Historical Information on Station 6

The former JWSC initially developed Station 6 in Jamaica, Queens as a water treatment plant in the 1930s and 1940s. The old treatment plant included aeration and green sand filtration for iron and manganese removal. To supply the plant, Wells 6, 6A, 6B, and 6D drew water from the Upper Glacial aquifer at an average depth of about 80 feet and Well 6C drew water from the Lloyd aquifer, the deepest of the aquifers, at a depth of 600 feet. The plant was last operated in 1985, with only Well 6C supplying it. The other wells were taken off-line in previous years due to high iron and manganese levels as well as the appearance of volatile organic compounds (VOCs). Although the water treatment plant is no longer operable, the on-site storage tanks and booster pump station are in use, as is the centralized Groundwater System monitoring and operation control facility.

2.3.3. Historical Information on Individual Wells

A brief description of each Individual Well is presented below (NYCDEP, n.d; NYCDEP, 2009).

2.3.3.1. Well 5

Well 5 which taps the Magothy aquifer and was first drilled in 1924, has a pumping capacity of 1200 gpm. In 1985, Well 5 was redrilled and rehabilitated to improve operability. However, in the mid-eighties, under the operation of the former JWSC, Well 5 was removed from service due to the detection of trichloroethylene (TCE) measured at a concentration of 64 µg/L (Dydland, 1994), above the regulated limit of 5 µg/L. In 1987, a packed column air stripper was installed for VOC removal (NYCDEP, 2001). The air stripping column was not designed to remove MTBE. Well 5 provided water to the distribution system as recently as February 2007.

2.3.3.2. Well 22

Well 22 which taps the Upper Glacial aquifer and was originally drilled in 1931 to a depth of 127 ft, has a capacity of 1020 gpm. It was overhauled in 1981. The well was last operated in 1994 when water quality data indicated 1,2-Dichloroethane contamination at a concentration of 11µg/L (Dyland, 1994; Holzmacher, McLendon, and Murrell, 1998).

In response to the drought conditions from 2001 through 2003, NYCDEP began to evaluate the reactivation of selected NYC Groundwater System wells. The duration and severity of the drought led NYCDEP to pursue treatment at select groundwater wells (see **Section 2.6.1**). As a result, a granular activated carbon (GAC) treatment system was installed at Well 22 for VOC removal.

2.3.3.3. Well 26

Well 26 which taps the Upper Glacial aquifer and was drilled to 115 ft in 1948, has a well capacity of 1000 gpm. Well operation was ceased in 1990 due to problems with the

The Draft Groundwater Management Plan (GWMP), which was prepared as a follow-up to the Brooklyn-Queens Aquifer (BQA) Project, was developed in 2007 and focuses on sustainable development and various management options for the groundwater resource. The GWMP considers many groundwater management alternatives based on accomplishing the best balance between the three major plan goals:

- water supply benefits
- flood control and other secondary benefits
- cost-effectiveness of the management solution

The alternatives are extensively described in the Draft Groundwater Management Plan (Malcolm Pirnie, 2007a).

2.6.2. Station 6 Demonstration Plant

Construction of the Station 6 Demonstration Plant will help to restore a significant portion of the desired production capacity. The goals of the Station 6 Demonstration Plant project are:

- Expand the capacity of the NYCDEP's Groundwater System by 10 mgd;
- Demonstrate that high quality drinking water comparable to the City's upstate supply can be produced from the aquifers beneath Queens and Brookyn;
- Restore administration and control center functionality within the proposed facility so that Station 6 remains the NYC Groundwater System headquarters;
- Provide groundwater flood relief and control for local residents, institutions, and infrastructure;
- Show that a treatment plant and operational control center can be designed to create a facility that is technically-sound and community-friendly within a residential community in Queens.

The planning process for Station 6 began in 2000. A pilot test of water treatment technologies for iron and manganese removal and softening was conducted in 2002 to 2003 (Malcolm Pirnie, 2003). The results of the pilot testing led to the development of a conceptual design for Station 6 (Malcolm Pirnie, 2004b). The full-scale process will also include VOC removal. Design activities for Station 6 are currently budgeted to resume in FY 2012.

- Biologically Active GAC
- Resins

The updated literature review revealed little new published information for all five of the technologies since the March 2007 evaluation. A summary of the recent findings is presented below:

- It was determined that both biologically active GAC and resins are still in the development phase. Therefore, biologically active GAC and resins require further research before they should be considered for MTBE removal at potable water installations, including NYCDEP's groundwater wells (Raynal, 2008; Waul, 2008; Ji, 2009; Lu, 2008; AWWARF, 2007).
- Advanced oxidation processes also remain very young technologies. From the new literature review, it was evident that the success of this technology is highly dependent on testing parameters such as: influent MTBE concentration, pH, temperature, contact time, AOP technology type and dose. In some instances, AOPs were determined to be unsuccessful technologies for the treatment of MTBE from potable waters with removals reported at less than 50%, while at other operating parameters, more than 99% reduction was achieved (Acero, 2001; Chang, 2000; Hu, 2008, Keller, 1998; Li, 2008; Sutherland, 2004). However, more remains to be learned about this technology, especially with respect to potential by-product formation, sizing, optimal placement in the treatment train, and peroxide dose. Thus, AOP is not considered to be a feasible VOC removal technology for Station 6 or the Individual Wells.
- As determined in 2004 and 2007, the current evaluation concluded that air stripping (with vapor-phase GAC) and GAC remain the most viable processes for the removal of MTBE at potable water facilities, including Station 6. Air stripping (with vapor-phase GAC) and GAC are both mature technologies with a number of full-scale drinking water applications making them applicable for implementation at NYCDEP's Station 6 Demonstration plant or the Individual Wells (Malcolm Pirnie, 2007c).

Additional background on MTBE treatment technologies can be found in the *Technical Memorandum, Evaluation of Options for Removal of Volatile Organics*, July 2004 (Malcolm Pirnie, 2004a) and the *MTBE Technology Update Memorandum*, March 29, 2007 (Malcolm Pirnie, 2007c).

9.3.2. Challenges Associated with MTBE Removal

Although air stripping installations have shown to be successful for the removal of MTBE from water when the concentrations are less than 1000 µg/L, the air handling requirements are often significant (as compared to removal of other volatile organic compounds) resulting in increased space requirements, operational complexity, and capital costs (Dyksen, 1999; McKinnon, 1984; NWRI, 2000). MTBE has a relatively low Henry's Law constant (K_H) that ranges from 0.018 at 20°C to 0.123 at 25°C (NWRI, 2000; Keller, 1998), which is indicative of MTBE's properties that once it is dissolved in

water, it is difficult to volatilize back into the gaseous phase. Therefore, air stripping requires a larger air-to-water ratio (often greater than 100:1) for MTBE applications in comparison to other VOCs, such as tetrachloroethylene (PCE), which typically only requires an air-to-water ratio of 40:1 in packed bed applications (Ramakrishnan, 2004).

MTBE removal via GAC is influenced by the competition for adsorption sites from other organic compounds including volatile organic compounds and natural organic matter (NWRI, 2001). For example, PCE has a higher adsorbability as compared to MTBE suggesting that if both PCE and MTBE are present, PCE will adsorb to the carbon before MTBE, resulting in fewer adsorption sites available for MTBE removal (ETDOT, 2001). MTBE requires longer contact times for GAC (as compared to other organic compounds) to contain the mass transfer zone within the adsorber, resulting in increased space requirements and capital costs (Sutherland, 2004). In addition, once the carbon becomes saturated with MTBE, it can no longer remove MTBE from the water and therefore the carbon must be replaced. Even at low influent concentrations, MTBE breakthrough can occur rapidly, resulting in a high carbon change-out frequency and increased operational costs (NWRI, 2001).

In addition to the challenges highlighted above, the following considerations also impact the treatment of MTBE:

- Concentration of MTBE in the raw water supply
- Duration that the MTBE will impact the water supply
- Presence of other VOCs, such as PCE, in the water supply
- Presence of MTBE degradation products, such as tertiary butyl alcohol (TBA), in the water supply

These challenges are addressed in the discussions below specific to Station 6 and the Individual Wells.

9.3.3. Station 6 Process Design Basis

This section describes the design basis for providing MTBE treatment at the Station 6 Demonstration Plant. Design criteria for the following are discussed:

- Design flow rates
- Raw water design criteria
- Finished water design criteria

9.3.3.1. Design flow rates

The maximum, average and minimum raw water flows that could enter the treatment plant were established previously by Malcolm Pirnie and are discussed in the *Technical Memorandum, Evaluation of Options for Removal of Volatile Organics,* July 2004

(Malcolm Pirnie, 2004a) , and the *VOC Removal Alternatives Analysis Technical Memorandum*, November 2007 (Malcolm Pirnie, 2007e). These flow rates are summarized in **Table 9-1**.

Table 9-1.
Station 6 Design Flow Rates

Condition	Flow Rate (mgd)
Maximum	10
Average	7.5
Minimum[1]	6

[1] The production rate could drop to 6 mgd for only short periods of time (i.e., less than one week)

9.3.3.2. Raw Water Design Criteria

This section discusses influent MTBE concentrations that are used for sizing of the MTBE removal technology. Other relevant raw water design criteria (e.g., pH, other VOCs) have been addressed in the *VOC Removal Alternatives Analysis Technical Memorandum*, November 2007 (Malcolm Pirnie, 2007e). In addition to MTBE, it is important to note that PCE is also present at concentrations requiring treatment (Malcolm Pirnie, 2004a; Malcolm Pirnie, 2007e). However, MTBE is the driver for the design of a treatment system and controls the sizing and in turn the costs. Tertiary-butyl alcohol (TBA), a degradation product of MTBE that is much more difficult to remove (as compared to MTBE), has only been detected in one sample at Station 6 at very low levels (Malcolm Pirnie, 2003); therefore, the removal of TBA has not been included in this design. If TBA were to be detected at significant concentrations in any of the Station 6 wells, it would pose a much bigger challenge to remove the contaminant and would greatly increase the costs of the selected VOC removal technology (Acero, 2001; Chang 2000; Li, 2008).

MTBE Raw Water Modeling Results

For the current analysis, the projected MTBE concentration trends at Station 6 were estimated by LBG using a groundwater flow and solute transport model (as discussed in **Section 8**). The analysis was based on available groundwater quality data, gasoline spill data, and anticipated future pumping scenarios. Contaminant transport modeling was performed for the two conditions as described in the LBG report (**Appendix C**).

Projected results from Analysis 1 for Wells 6, 6A, 6B, 6C, 6D, and 33 are shown in **Figure 9-1**.

EXHIBIT C

NY 56

Engineering Report

MALCOLM PIRNIE INC.
LIBRARY COPY
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PARAMUS

MASTER WATER SUPPLY PLAN UPDATE REPORT

Jamaica Water Supply Company
Lake Success, New York

PLEASE SIGN CARD ON
BACK INSIDE COVER

PROJECT: 0691-07-1100

MALCOLM PIRNIE

ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

TABLE 3-5

WELLS TO BE ABANDONED

Category	Location	Aquifer	Well	Comments (all concentrations in ug/L "N" denotes non-detectable)
III (Abandon)	Queens High Zone	Upper Glacial	19	High iron, low capacity
			22	*PCE 6-36, 1986-6 low capacity, area subject to salt water intrusion
			41	PCE 18-33, 1983-33 TCE 16-480, 1983-16 area subject to salt water intrusion
			52	PCE N-7, 1986-7 low capacity area subject to salt water intrusion
		Magothy	51	PCE 10-38, 1986-9, reduce withdrawals
	Queens Low Zone	Upper Glacial	3	Nitrates, reduce withdrawals
			3A	Nitrates, reduce withdrawals
			4	PCE N-32, 1986-11, nitrates, reduce withdrawals
			6	PCE-260, 1982-260 high iron, low capacity
			6A	PCE 2-5, 1982-2 high iron
			6B	no data
			6D	PCE 97-300, 1983-97 high iron
			8	PCE 5-32, 1985-6 low capacity TCE 3-110, 1985-35
			24	No Data
			24A	PCE 97-441, 1982-149, low piezometric surface

MALCOLM PIRNIE

TABLE 3-5

WELLS TO BE ABANDONED

(Continued)

Category	Location	Aquifer	Well	Comments (all concentrations in ug/L "N" denotes non-detectable)
III (Abandon)	Queens Low Zone	Upper Glacial	24B	PCE 14-117 iron low piezometric surface
			24C	PCE 1-3, 1982-3, iron
			29	PCE 4,000-10,000, 1983-7,000
			32	PCE 8-57, 1986-8, low capacity, chlorides
			33	Xylene N-124, 1986-N, low capacity, PCE N-4, 1986-1, high iron
			39	PCE N-22, 1986-22 low capacity
			42	PCE 1-6, 1985-5, low capacit
		Magothy	29A	PCE 64-290, 1983-290 TCE 6-65, 1983-28
		Jameco	11	Chlorides 1986-263 mg/L
	Nassau High Zone	Upper Glacial	16	PCE 33-380, 1979-380 No data since 1979.
	Nassau Low Zone	Upper Glacial	28	TCE 2-195, 1983-14

*"PCE 6-36, 1986-6" denotes that tetrachloroethylene is the contaminant of concern, it has been detected in the range of 6 ug/L to 36 ug/L during the period of record, 1979-1986, and the most recent available data is 1986, concentration of 6 ug/L.

MALCOLM PIRNIE

EXHIBIT D

IN THE UNITED STATES DISTRICT COURT

FOR THE SOUTHERN DISTRICT OF NEW YORK

\- - -

IN RE: METHYL TERTIARY BUTYL ETHER ("MTBE") PRODUCTS LIABILITY LITIGATION	:	Master File C.A. No. 1:00-1898
	:	MDL 1358(SAS)
This document relates to the following cases:	:	M21-88
City of New York v. Amerada Hess Corp., et al, 04 Civ. 3417	:	

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April 20, 2009

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Videotaped expert deposition of MARNIE A. BELL, P.E., taken pursuant to notice, was held at the law offices of McDermott Will & Emery LLP, 340 Madison Avenue, New York, New York, beginning at 10:01 a.m., on the above date, before Kimberly A. Cahill, a Federally Approved Registered Merit Reporter and Notary Public.

\- - -

GOLKOW TECHNOLOGIES, INC.
877.370.3377 ph | 917.591.5672 fax
deps@golkow.com

A. Our costs are for MTBE treatment, which is the primary driver for the treatment and costs.

Q. Is it fair to say that the treatment systems that you've proposed for installation on the City's wells will remove other volatile organic chemicals?

A. It depends on what those other volatile organic chemicals are; however, for PCE, that could be easily removed with either treatment technology that might be implemented for MTBE removal.

Q. So the treatment designs that you've proposed for installation on the focus wells will remove PCE; correct?

A. It depends on whether PCE is present at that well or not. That's not necessarily true.

Q. Have you historically taken PCE concentrations into account in your design proposals for station 6?

A. I mean -- at station 6, yes, we have acknowledged that PCE is there

and also must be treated.

Q. So the design that you've proposed for station 6 in your expert report will treat PCE in the water detected at station 6 wells; correct?

A. Correct, it's intended that treatment at that site will also treat for PCE.

Q. And did you discount from your proposed costs for MTBE treatment the cost associated with treating PCE?

A. Well, MTBE is the driver for the VOC process at that site, and all those costs will be incurred regardless of whether PCE is present or not present.

Q. So is it your testimony that if MTBE was never detected in the wells at station 6, the City doesn't need to put treatment on the station 6 wells if it wants to deliver that water to customers?

A. No, that's not my testimony. If there was no MTBE treatment there -- or if there was no MTBE present in the

wells, the City would still install VOC treatments for PCE removal.

Q. Did you as part of your work review any regulations from any government agency in New York which specified that it was required to treat MTBE to nondetect in drinking water?

A. We have reviewed the state sanitary code, New York state -- we've reviewed New York State's sanitary code, which requires that systems be designed in accordance with ten state standards, which requires that organic contamination be minimized to the greatest extent possible and requires treatment to the lowest practical level.

Q. Okay.

MS. KALNINS TEMPLE: We'll mark an exhibit as Exhibit 6, which is the Recommended Standards for Water Works, 2003.

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(Deposition Exhibit No. M. Bell-6, Recommended Standards for

EXHIBIT E

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Revised Report
Dated April 1, 2009

Treatment of MTBE in Selected Wells In City of New York v. Amerada Hess Corp. et al.

Expert Report of David W. Hand, Ph.D.

In the matter of:

City of New York
Plaintiffs

MDL No. 1358

Amerada Hess Corp., et al.
Defendants

April 1, 2009

Prepared by
David W. Hand, Ph.D.

4/01/09

SUMMARY OF OPINIONS

1. The first factor to be considered in assessing a water treatment plant design is the level of contamination in the water source. In this case, I have reviewed the following sources of information regarding MTBE contamination in the wells I was asked to assess: Expert Report of Fletcher Driscoll (2009) ("Driscoll 2009 Report"), VOC Removal Alternative Analysis Technical Memorandum, Donald Cohen and Marnie Bell, Malcolm Pirnie (2007) ("Cohen and Bell 2007 Report"), Expert Report Donald Cohen and Marnie Bell (2009) ("Cohen and Bell 2009 Report")and the Expert Report of David Terry (2009)) ("Terry 2009 Report").
2. Based on data from the selected wells and the Driscoll 2009 Report, MTBE will not be present in the Station 6 wells above the New York State Department of Health (NYDOH) maximum contaminant level (MCL) of 10 µg/L and will more than likely be below detectable levels in the year 2016. As such, it is my opinion that these wells will not require further treatment for MTBE. In addition, wells 5, 22, 26, 39 and 45 do not require treatment for MTBE because their reported 2007 values are significantly below the NYDOH MCL and the MTBE concentration trend in each well is decreasing.
3. The Cohen and Bell 2007 Report assessed treatment of the water from the Station 6 wells beginning far in advance of 2016. As treatment for Station 6 wells is not scheduled to begin until at least 2016, this report is no longer relevant. Even if treatment were initiated in 2009, however, only well 6D may require treatment. If so, it would require treatment for approximately three years to a maximum of six years. GAC liquid-phase treatment would be the most cost effective treatment process for this well. At a pumping rate of 650 gpm, GAC treatment with beds in parallel operation would yield a total cost of $ 1,160,000 assuming a half-life of one year for MTBE and three years of operation. For a half-life of two years for MTBE treatment and six years of operation, the total cost for treatment is $ 1,953,000.

sufficient to describe the rate of decrease in the MTBE concentration with time. Figure 2 displays a projection of the MTBE concentrations if the MTBE concentration decreases with a half-life of one year. If well 6D is to be treated immediately, Figure 2.0 can be used to project the MTBE concentrations and used for design of a well 6D treatment system for a minimum period of three years. However, if a more conservative approach is used, assuming a half-life of two years, well 6D will be treated for a period of six years. Treatment for both the half-life of one and two years is evaluated in this report.

If well 6D requires immediate treatment, tetrachloroethene (PCE) will also have to be treated. Most recent data for well 6D has the concentration of PCE at 6.7 μg/L. The NYDOH MCL for PCE is 5.0 μg/L so I have assumed treatment to 2.5 μg/L. The cost of treating of PCE will be factored into the cost of MTBE treatment because if MTBE was not present, well 6D would still have to be pumped; and capital, operation and maintenance costs would be realized for PCE.

Since the treatment for well 6D is short in duration, liquid-phase GAC treatment would be the best treatment option.

Adsorption Design Software AdDesignS

The commercially available AdDesignS software is widely used to evaluate GAC adsorber design. Due to the lack of GAC performance data for the System 6 water matrix, AdDesignS was used to evaluate the adsorption design and determine the GAC usage rates in this report. AdDesignS (Hokanson et al, 1999) incorporates the Pore Surface Diffusion Model (PSDM). The PSDM is a comprehensive mass transfer model commonly used for the predictive modeling of GAC adsorbers. The development and verification of the PSDM has been well documented in reports and refereed journal articles (Hand et al., 1984; Friedman, 1986; Crittenden et al, 1987; Sontheimer et al, 1988; Kuennen et al,

1989; Hand et al, 1989, Hand et al, 1994; Hand et al, 1995; Hand et al, 1997; NWRI, 2000; Jarvie et al; 2005).

MTBE treatment and cost for well 6D for a period of three years.

As stated above, if well 6D is to be treated immediately, the time required for treatment would be three years for a MTBE half-life of one year and six years for an MTBE half-life of two years. Figure 2.0 is used to project the MTBE concentrations and used for design of a well 6D treatment system for that three year period. A similar plot can be made for a two year half- life extending to six years. The most practical treatment option is to use liquid-phase GAC with a treatment objective of 5 µg/L. Table 3.0 summarizes the design using two GAC adsorbers in parallel with each adsorber handling a flow rate of 325 gpm. The average usage rate based on two beds operating in parallel is 0.47 lb GAC per 1000 gallons of water treated.

If well 6D requires immediate treatment, PCE will also have to be treated regardless of MTBE treatment. The treatment costs should reflect the impact of PCE treatment. Consequently, PCE treatment would share half of the capital costs, and a portion of the operation and maintenance costs. AdDesignS calculations were performed to determine the usage rate for PCE based on two beds in parallel operation. The PCE usage rate estimated by AdDesignS was 0.0764 lb per 1000 gallons of water treated. For a half-life of one and two years, the total quantity of GAC needed for PCE is summarized in Table 5.0.

Tables 4.0 and 5.0 summarize the capital and operation costs, respectively, associated with treating well 6D. If well 6D requires treatment for a period of three years (one year half-life) at a pumping rate of 650 gpm and a treatment objective of 5µg/L, the total cost is estimated to be $ 1,160,000 (See Table 3.0). If well 6D requires treatment for a period of six years (two year half-life), the total estimated cost is $ 1,953,000.

Table 4.0 Summary of capital cost for Well 6D GAC adsorber design.

Item Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
GAC vessels (12 ft diameter, 22,000 lbs per unit)	Ea.	2	125,000	250,000
GAC piping, valves, fittings	-	-	-	125,000
Plant Electrical, Instrumentation and Controls – GAC units	-	-	125,000	125,000
Installed Subtotal direct costs				500,000
Site work & Site piping	-	26.5%	500,000	133,000
Design contingency		5%	500,000	25,000
Construction contingency		10%	500,000	50,000
Administrative services		5%	500,000	25,000
Total Capital Cost Estimate (2009 dollars)				**733,000**
Total Capital Cost Estimate (2009 dollars) for MTBE[1]				**367,000**

[1]Since PCE would also need treatment the capital costs should be split in half.

EXHIBIT F

IN THE UNITED STATES DISTRICT COURT

FOR THE SOUTHERN DISTRICT OF NEW YORK

In Re: Methyl Tertiary Butyl Ether ("MTBE") Products Liability Litigation	MDL No. 1358 (SAS)
CITY OF NEW YORK, Plaintiff, vs. AMERADA HESS CORPORATION, et al., Defendants.	Case No. 04 Civ. 3417

Videotaped Deposition of DAVID W. HAND, Ph.D.

Washington, D.C.

Thursday, April 23, 2009

9:00 a.m.

Reported by: Michele E. Eddy, RPR, CRR, CLR

in your view the lawsuit over PCE should recover nothing because there's no incremental cost associated with treating it. Do I misunderstand you?

MR. McGILL: Objection to form. Misstates the testimony.

A I guess I would have to think about it. I don't have an opinion on that.

Q You don't have a fairness and honest opinion on that?

MR. McGILL: Objection to form.

A I guess both parties would pay.

Q How would you go about allocating in that situation?

A I don't know. It would not be up to me to allocate, but I think both parties should pay their fair share.

Q Is it up to you to allocate in this case?

MR. McGILL: Object to the form.

A No, but I'm giving my opinion.

Q And I'm asking for your opinion on a hypothetical which I'm entitled to do as well.

Is your opinion on a hypothetical where the city were suing over PCE but not over MTBE is that you have no opinion in that context?